ZHONE

ETHX-DS3-1-LT and ETHX-DS3-2-LT

DS3 EtherXtend Access Device Installation Instructions

Document Number ETH3-A2-ZN10-00

May 2007

Contents

Software and Firmware License Agreement 2

Introduction to ETHX-DS3-1-LT and ETHX-DS3-2-LT 4

Package Contents 5

Release Notes 5

Powering Up the Network Extender 6

Connecting the DS3 Lines 8

Connecting the Ethernet Lines 9

LED Indicators 10

Web Interface 12

Command Line Interface 17

Resetting the Network Extender to Factory Defaults 19

Specifications 22

EMI Notices 23

NEBS Compliance 23

Service and Repair 24

Important Safety Instructions 25

Product Documentation Online 26

Software and Firmware License Agreement

ONCE YOU HAVE READ THIS LICENSE AGREEMENT AND AGREE TO ITS TERMS, YOU MAY USE THE SOFTWARE AND/OR FIRMWARE INCORPORATED INTO THE ZHONE PRODUCT. BY USING THE ZHONE PRODUCT YOU SHOW YOUR ACCEPTANCE OF THE TERMS OF THIS LICENSE AGREEMENT.

IN THE EVENT THAT YOU DO NOT AGREE WITH ANY OF THE TERMS OF THIS LICENSE AGREEMENT, PROMPTLY RETURN THE UNUSED PRODUCT IN ITS ORIGINAL PACKAGING AND YOUR SALES RECEIPT OR INVOICE TO THE LOCATION WHERE YOU OBTAINED THE ZHONE PRODUCT OR THE LOCATION FROM WHICH IT WAS SHIPPED TO YOU, AS APPLICABLE, AND YOU WILL RECEIVE A REFUND OR CREDIT FOR THE ZHONE PRODUCT PURCHASED BY YOU.

The terms and conditions of this License Agreement (the “Agreement”) will apply to the software and/or firmware (individually or collectively the “Software”) incorporated into the Zhone product (the “Product”) purchased by you and any derivatives obtained from the Software, including any copy of either. If you have executed a separate written agreement covering the Software supplied to you under this purchase, such separate written agreement shall govern.

Zhone Technologies, Inc (“Zhone”) grants to you, and you (“Licensee”) agree to accept a personal, non-transferable, non-exclusive, right (without the right to sublicense) to use the Software, solely as it is intended and solely as incorporated in the Product purchased from Zhone or its authorized distributor or reseller under the following terms and conditions:

1. Ownership: The Software is the sole property of Zhone and/or its licensors. The Licensee acquires no title, right or interest in the Software other than the license granted under this Agreement.
2. Licensee shall not use the Software in any country other than the country in which the Product was rightfully purchased except upon prior written notice to Zhone and an agreement in writing to additional terms.
3. The Licensee shall not reverse engineer, decompile or disassemble the Software in whole or in part.
4. The Licensee shall not copy the Software except for a single archival copy.

5. Except for the Product warranty contained in the manual, the Software is provided “AS IS” and in its present state and condition and Zhone makes no other warranty whatsoever with respect to the Product purchased by you. THIS AGREEMENT EXPRESSLY EXCLUDES ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, OR ORAL OR WRITTEN, INCLUDING WITHOUT LIMITATION:

    a. Any warranty that the Software is error-free, will operate uninterrupted in your operating environment, or is compatible with any equipment or software configurations; and

    b. ANY AND ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT.

    Some states or other jurisdictions do not allow the exclusion of implied warranties on limitations on how long an implied warranty lasts, so the above limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from one state or jurisdiction to another.

6. IN NO EVENT WILL ZHONE BE LIABLE TO LICENSEE FOR ANY CONSEQUENTIAL, INCIDENTAL, PUNITIVE OR SPECIAL DAMAGES, INCLUDING ANY LOST PROFITS OR LOST SAVINGS, LOSS OF BUSINESS INFORMATION OR BUSINESS INTERRUPTION OR OTHER PECUNIARY LOSS ARISING OUT OF THE USE OR INABILITY TO USE THE SOFTWARE, WHETHER BASED ON CONTRACT, TORT, WARRANTY OR OTHER LEGAL OR EQUITABLE GROUNDS, EVEN IF ZHONE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY THIRD PARTY.

7. The rights granted under this Agreement may not be assigned, sublicensed or otherwise transferred by the Licensee to any third party without the prior written consent of Zhone.

8. This Agreement and the license granted under this Agreement shall be terminated in the event of breach by the Licensee of any provisions of this Agreement.

9. Upon such termination, the Licensee shall refrain from any further use of the Software and destroy the original and all copies of the Software in the possession of Licensee together with all documentation and related materials.

10. This Agreement shall be governed by the laws of the State of California, without regard to its provisions concerning conflicts of laws.

Introduction to ETHX-DS3-1-LT and ETHX-DS3-2-LT

Zhone's ETHX-DS3-1-LT and ETHX-DS3-2-LT are loop bonding Ethernet extenders that provide up to 45 Mbps (ETHX-DS3-1-LT) or 90Mbps (ETHX-DS3-2-LT) of symmetrical bandwidth using DS3 lines for transport.

The ETHX-DS3-1-LT features one DS3 port, and the ETHX-DS3-2-LT has two DS3 ports, each capable of up to 45 Mbps bandwidth. One or two ports may be used to deliver Ethernet connections over DS3 facilities of any given length. Zhone's loop bonded technology provides automatic load balancing and fail-over for optimum redundancy and data throughput. In addition the ETHX-DS3-1-LT and ETHX-DS3-2-LT support industry standard C-Bit Parity DS3 transport facilities, ensuring maximum distance and flexibility.

The ETHX-DS3-1-LT and ETHX-DS3-2-LT can be connected in any combination so long as every connection pairs a provider and a subscriber unit.

ETHX-DS3-x-LT units are shipped from the factory configured as provider units. This configuration can be changed via web management. If you wish to connect a pair of new units in a point to point network configuration, one of the units must be re-configured to the subscriber mode. See the “Web Interface” section of this document for the procedure to accomplish this.

Provider and Subscriber Defaults

The following table highlights the differences between provider and subscriber units.

Table 1. Unit Defaults by Type

Feature	Provider Unit	Subscriber Unit
Default IP Address	192.168.254.252	192.168.254.251
Out of Band Management	Over Ethernet Ports	Over DS3 Ports
Inband Management	Over DS3 Ports	Over Ethernet Ports
Response to Broadcast ARP Request by IP Address	Unit answers.	Unit does not answer on DS3 ports; answers only to ARP request on Ethernet ports.

Package Contents

Unpack and Inspect the network extender. If there is any visible damage, do not attempt to connect the device. Contact your sales or service provider.

Release Notes

Before installing your network extender, review the release notes for your model. These are available on the “Service and Support” page under the documentation heading at the Zhone website.

http://www.zhone.com/support/manuals/net_ext_manuals#rnotes

Powering Up the Network Extender

The DC power terminal block on the network extender has five terminals: two positive, two negative, and one with no connection. Only one positive terminal and one negative terminal pair need be connected for operational purposes. The second positive and negative terminal pair may be connected to a backup DC power supply for redundancy. There is also a system ground terminal on the back panel above the power connector. Connect this terminal to a reliable source of ground. The ground terminal must always be connected regardless of the powering connections. DO NOT OPERATE THE NETWORK EXTENDER WITHOUT A GROUND CONNECTION.

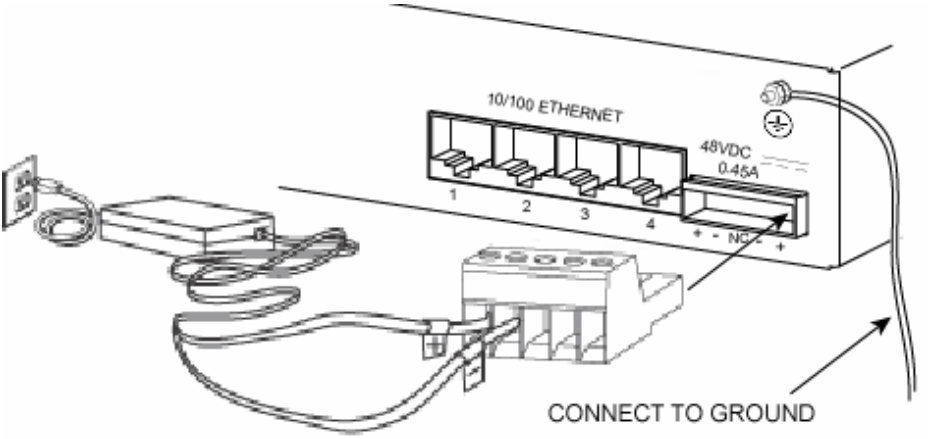
➢ Procedure

Ground Connection

1. Connect a copper wire of at least 18 AWG from a ground source to the ground lug on the back of the case. In Telco central office installations, the ground source must be a Common Bonding Network (CB-N)
2. The ampacity of the ground conductor shall be equal to or greater than the ampacity of the conductor connected to the DC power connection's DC return.
3. Strip the end of the ground wire. The bare stripped ends of the ground conductor must be coated with an anti oxidation compound before crimp connections are made to connector terminals. Crimp a connector, of a suitable size to fit the ground lug on the chassis, on to the prepared wire end. Use only listed connection terminals on the ground wire.
4. The ground lug on the unit has two nuts with a star washer between them. Remove the outer nut and star washer, put the ground connector (prepared in step 3 above) over the ground stud on the chassis. Replace the star washer on the stud, then the nut. Tighten the nut so that the ground connection is secure and will not rotate.

Power Connection – DC Power

1. Loosen all screws at the top of the power terminal strip.
2. Insert your –48 VDC lead into the negative (–) terminal of a terminal pair. Tighten the screw for that terminal.
3. Insert your 48 VDC return lead into the positive (+) terminal of the same terminal pair as in Step 2. Tighten the screw for that terminal.
4. Repeat Step 2 and Step 3 for the free pair of power terminals if you have a redundant power supply.
5. Plug the power terminal strip into the power connector on the back of the unit.
6. Verify that the Power LED on the front of the network extender is illuminated.



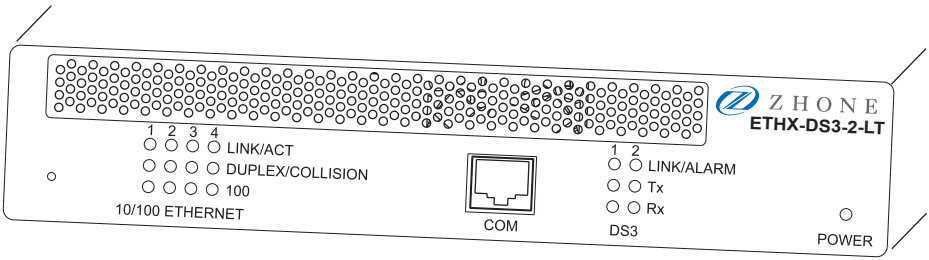
Power Connection – AC Power

1. The AC power supply is shipped with the power terminal strip already attached. No AC power supply other than the one supplied with the ETHX-DS3-x-LT is approved for use in powering the unit. Using any other AC power supply could cause the unit to be non-compliant to emissions and safety regulations.

2 Plug the power terminal strip into the power connector on the back of the unit.

3 Plug the AC power cord into the AC power supply and into a compatible AC outlet.

4. Verify that the Power LED on the front of the network extender is illuminated.



Connecting the DS3 Lines

The primary feature of the network extender is loop bonding capability, although both the provider and subscriber units are able to function with a single DS3 connection.

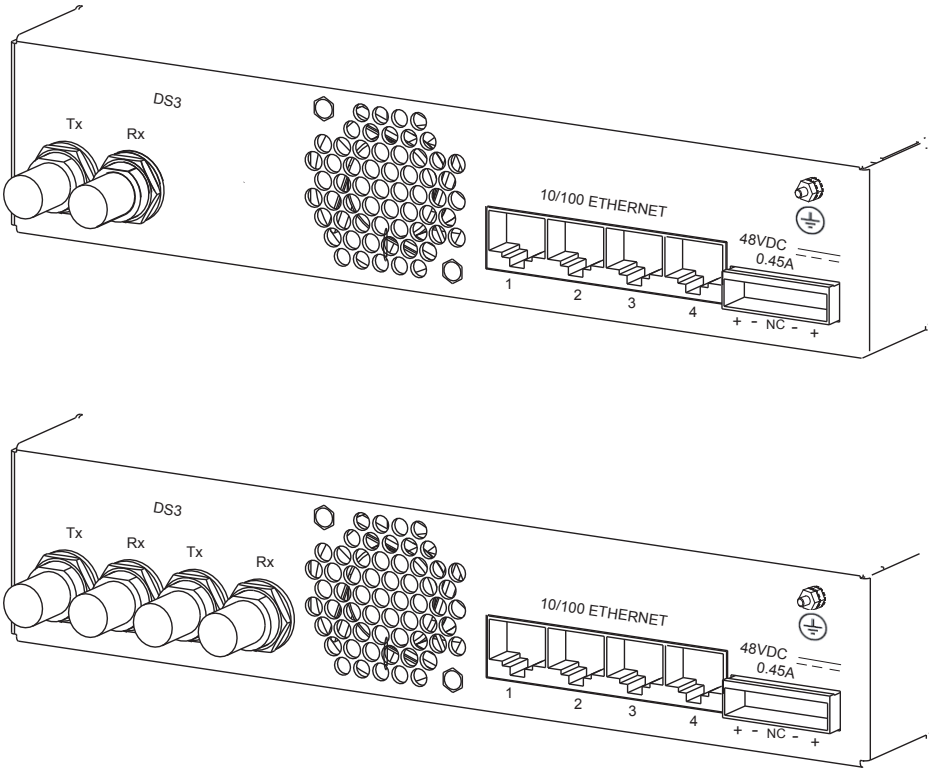
Loop Bonded Connection

Using two DS3 lines for one network connection (loop bonding) multiplies the speed and data passing capability of the network extender. Two DS3 lines also act as a backup should one of the lines become disabled.

A network extender can only establish loop bonded connections with other Zhone equipment with the loop bonding feature.

➢ Procedure

1. Plug the DS3 cables into the DS3 BNC 75 ohm connectors on the back of the network extender. Each DS3 connection requires two coax cables; one for transmit (Tx) and one for receive (Rx). Either port can be connected first.



2. Verify all connections: the DS3 LINK/ALARM LEDs on the front of the network extender will pulse green to indicate the connections are established and operational.

Single DS3 Connection

A single line connection can be established between a single port subscriber unit and either a single port or dual port ETHX-DS3-x-LT provider unit. Likewise, a single line connection can also be established between a single port provider unit and either a single port or dual port ETHX-DS3-x-LT subscriber units.

➢ Procedure

1. Plug two coax cables, one for transmit (Tx) and one for receive (Rx), into the DS3 BNC 75 ohm ports on the back of the network extender.
2. Verify the connection: the DS3 LINK/ALARM LED on the front of the network extender will pulse green to indicate the connection is established and operational.

Connecting the Ethernet Lines

The 10/100BaseT Ethernet ports can auto-negotiate speed and duplex mode in accordance with the remote equipment to which it is connected, or Ethernet speed and duplex mode configurations can be configured using web management. (See *Web Interface* on page 12.) For the best connection results, the remote devices (PCs, hubs, or switches) should be set to auto-negotiate speed and duplex mode.

➢ Procedure

1. Plug the Ethernet cable into one of the 10/100 ETHERNET ports on the back of the network extender. A straight-through cable can be used for all applications.
2. Verify the connection: solid green illumination of the corresponding 10/100 ETHERNET Connection LINK/ACT (Link/Activity) LED on the front of the network extender indicates a connection has been established. If the Ethernet LINK/ACT LED is illuminated but not the Ethernet 100 LED, then a 10 Mbps connection has been established. If the Ethernet LINK/ACT and 100 LEDs are both illuminated, then a 100 Mbps connection has been established.

LED Indicators

Table 2. LEDs (1 of 2)

LED	State	Indication	Additional Information
10/100 Ethernet Connections LINK/ACT	Pulsing Green	Standard operation	Traffic is flowing without any problems.
	Solid Green	Ethernet connection is established	If the Ethernet LINK/ACT LED is illuminated but not the Ethernet 100 LED then a 10 Mbps connection has been established. If the Ethernet 100 LED is also illuminated, then a 100 Mbps connection has been established.
	Not Illuminated	No Ethernet connection	The Ethernet 100 and Act LEDs will remain unlit by default.
10/100 Ethernet Connections Duplex/ Collision	Solid Amber	Full duplex Ethernet connection.	
	Not Illuminated	No link or functioning at half duplex.	
	Pulsing Amber	Half duplex link with packet collisions.	
10/100 Ethernet Connections 100	Solid Green	100 Mbps Ethernet connection is established	If the Ethernet 100 LED is illuminated, the Ethernet Lnk/Act LED will be green.
	Not Illuminated	No 100 Mbps Ethernet connection	If the Ethernet 100 LED remains unlit but the Ethernet LINK/ACT LED is green, then a connection has been established at 10 Mbps rather than 100 Mbps.

Table 2. LEDs (2 of 2)

LED	State	Indication	Additional Information
DS3 Connections LINK/ACT (Ports 1 or 1&2)	Flashing Green*	DS3 connection is established and active	Traffic is flowing.
	Solid Green	DS3 link	A connection exists but there is indication of a problem with the DS3 line.
	Solid Amber	Remote Alarm Indication (RAI). The outgoing connection from the unit has been lost; no data is being transmitted.	Yellow alarm. The unit's partner network extender has lost its incoming connection and has LOS.
	Pulsing Amber	Alarm Indication Signal (AIS). An indirect connection has been lost; the unit may no longer be receiving data from its partner network extender.	Blue alarm. The unit's partner network extender has lost a connection with an intermediate device and has LOS or RAI.
DS3 Connections Tx (Ports 1 or 1&2)	Flashing Amber	Data is being transmitted	.
	Not Illuminated	No data is being transmitted.	
DS3 Connections Rx (Ports 1 or 1&2))	Flashing Amber	Data is being received.	
	Not Illuminated	No data is being received.	
Power	Solid Green	The unit is powered	If the Power LED is not illuminated, it is unlikely that the network extender is receiving power and therefore none of the LEDs will be illuminated

* A pulsing LED blinks steadily at a rate of once per second. A flashing LED blinks at a more rapid, less constant rate.

Web Interface

The network extender's integral web management lets you configure and monitor the network extender using a standard web browser.

To manage a Provider unit using web management, connect your PC to any Ethernet port of the Provider unit.

By default, the Subscriber unit can be managed by the web management through its Ethernet ports. If you wish to manage the subscriber unit via a DS3 ports, and the unit still has the default IP address, you must first create a static ARP in your PC.

Establishing an ARP Table Entry for a Subscriber Unit

The subscriber unit's DS3 ports will not respond to an ARP request containing the unit's default IP address. In order to manage the subscriber unit using web management you must create a static ARP table entry on your PC. To build a static ARP table entry:

➢ Procedure

Note – This procedure is not necessary if you are connecting directly to the Ethernet ports on either the provider or subscriber units.

1. Get the MAC address from the bottom label of the subscriber unit.
2. Open a command prompt. (Click on Start, and then Run. In the **Open:** window type **CMD** and press Enter.) At the command line, type:

   ```
   arp -s 192.168.254.251 xx-xx-xx-xx-xx-xx
   ```

   where the IP address is the default address of the subscriber unit and the MAC address is the number on the bottom label. For example: if the MAC address on the bottom label is 00-50-ca-01-28-86, type:

   ```
   arp –s 192.168.254.251 00-50-ca-01-28-86
   ```

Once the ARP table entry is configured, you can ping and manage the unit using web management.

If you change the IP address to anything other than the default, the subscriber unit responds to ARP requests and does not require a static ARP table entry to manage it using web management.

For security purposes you may want to turn off inband management of the unit to prevent a local PC from managing the unit from the Ethernet ports.

Web Interface System Requirements

- **Web Browser** – Required for running web management. Compatible web browsers include, but are not limited to, Microsoft Internet Explorer (v4.0 or higher) and Netscape Navigator (v4.0 or higher). web management is optimized for use with Internet Explorer.

  Use your browser's default settings when running web management. JavaScript must be enabled.

- **Screen Resolution** – 1024 x 768 pixels is the minimum resolution required for all web management views to fit within the dimensions of most monitors and laptops. Lower screen resolutions (such as 800 x 600 pixels) may cause web management screens to exceed the width or height of the screen. To verify screen resolution on a Windows system:

  — Right click on your desktop

  — Select Properties

  — Click the Settings tab

  — Adjust the Screen Resolution as needed

Configuring Your Windows PC to Communicate with Web Management

To communicate with web management, your PC's Ethernet interface must be on the same subnet as the network extender. For example, to configure the IP address under Windows XP:

➢ Procedure

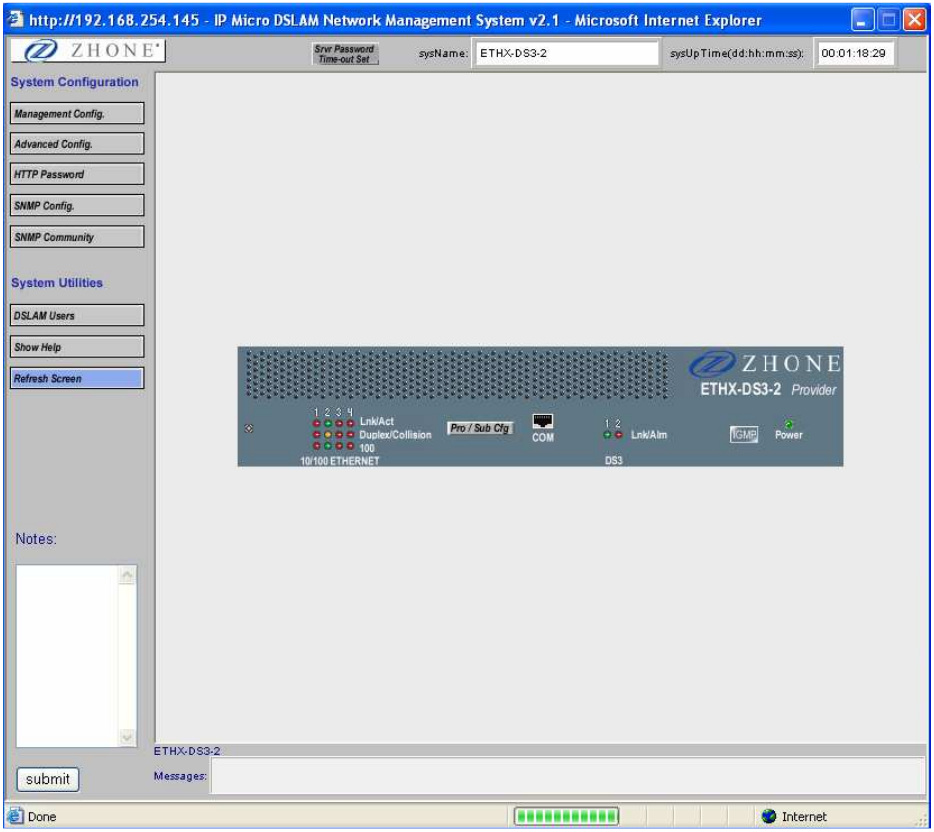
1. In the Windows task bar, click on the Start button, and then click on Control Panel.
2. Double-click on the Network Connections icon.
3. In the LAN or High-Speed Internet window, right-click on the icon corresponding to your network interface card (NIC) and select Properties. (Often this icon is labeled Local Area Connection.) The Local Area Connection dialog box is displayed with a list of currently installed network items.
4. Ensure that the check box to the left of the item labeled Internet Protocol (TCP/IP) is checked, and click on Properties.
5. Write down the current IP Address and Subnet Mask in the Internet Protocol (TCP/IP) Properties dialog box. When you are done using web management, you will need to reconfigure your PC with these values.
6. In the Internet Protocol (TCP/IP) Properties dialog box, click in the radio button labeled "Use the following IP address" and type 192.168.254.x (where x is any number between 3 and 250, inclusive) in the IP Address field.
7. Type 255.255.255.0 in the Subnet Mask field.
8. Click on OK twice to confirm your changes, and close the Control Panel.
9. Start your web browser. Type 192.168.254.252 (for a provider unit) or

192.168.254.251 (for a subscriber unit) into the Address field and press Enter. The web server opening screen appears.

10. Click on >> Next >>. The login dialog box appears. Log in using:

Username:	superuser	Note – Username and password are case sensitive. Enter them exactly as shown
Password:	Password	

The web management home page appears.

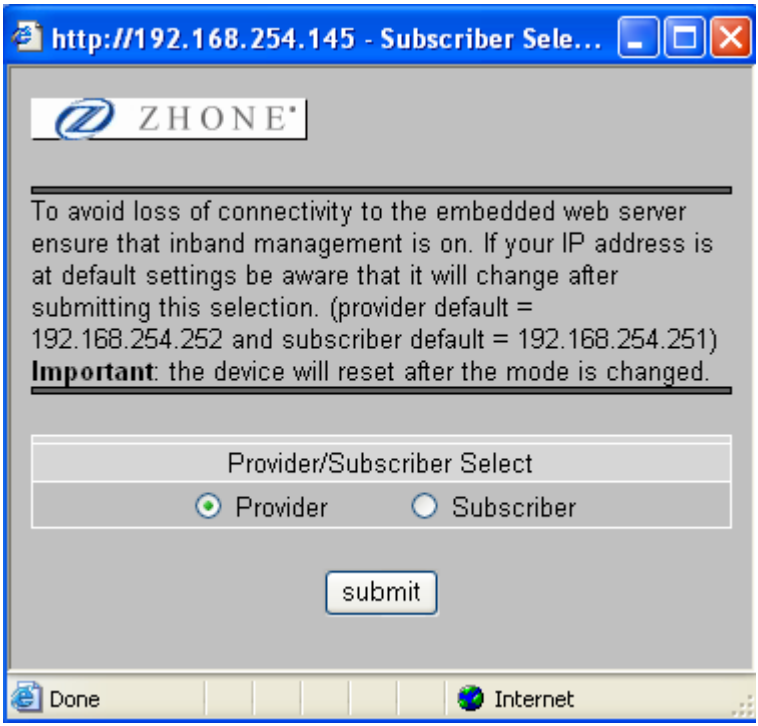


From this screen you can:

Click on . . .	**To configure . . .**
Management Config.	IP Address, Subnet Mask, Default Gateway, Inband Management VLAN ID and Priority
Advanced Config.	System Name and Location, Management IP Address Filter, TFTP and Telnet access
HTTP Password	General and Superuser Passwords
SNMP Config.	SNMP Notification IP Addresses and SNMP Traps
SNMP Community	SNMP Community Names
Pro/Sub Cfg	Provider or Subscriber mode
IGMP	IGMP configuration, MAC (Display only) Search (IGMP or MAC)
Srvr Password Time-out Set	Change web management Password Time-out
DSLAM Users	Display only
Show Help	Provides a link to on line help via the Internet
Refresh Screen	Refreshes web management screen
Ethernet Connections Lnk/Act LEDs	Ethernet Duplex Mode, Speed, and Native VLAN ID
DS3 Connections Lnk/Alm LEDs	DS3 Circuit Configuration DS3 (Tx Buildout, and Clock Source, etc), Filter Configuration, DSCP Rules, IP Rules, MAC Rules, VLAN Rules, Flood type, Port Statistics, and Port Copy

Configure Provider or Subscriber Mode

To reconfigure a unit from provider to subscriber mode, open the web management home page as described above. Observe the designation displayed on the center right side of graphical view of the front of the unit. It will display either the word “Provider” or “Subscriber” indicating the current mode of the unit. To make a change, click on the “Pro/Sub Cfg” button which is located just left of center on the graphical view of the front of the unit. This will bring up the following screen:


http://192.168.254.145 - Subscriber Sele...
ZHONE
To avoid loss of connectivity to the embedded web server ensure that inband management is on. If your IP address is at default settings be aware that it will change after submitting this selection. (provider default = 192.168.254.252 and subscriber default = 192.168.254.251)
Important: the device will reset after the mode is changed.
Provider/Subscriber Select
Provider
Subscriber
submit
Done
Internet

Click on the button associated with the desired mode for the unit. Then click on the submit button. Go back to the home page and confirm that the display now shows the new mode.

Command Line Interface

The network extender can be managed with a Command Line Interface (CLI) through either a direct PC to COM (Communication) Port connection or from a remote network connection via Telnet.

CLI System Requirements

- **Straight-Through 8-Pin Modular Ethernet Cable –** Required for establishing a direct connection from the COM port to a DB9 adapter.
- **DB9 Female to 8-Pin Modular Male Adapter –** Required for conversion of your PC's RS232 serial port for use with the Ethernet cable.
- **Terminal Emulation Program –** Required for running the CLI over a direct connection. The program must emulate a VT100 terminal.
- **Telnet Client –** Required for remote management with the CLI. Microsoft Windows Operating Systems (98, 2000, NT, and XP) include a Telnet client which is run using the Windows command prompt (cmd.exe). If you are using an operating system other than Windows, you may need to install a Telnet client.

Connecting a PC Directly

Initial configuration using the CLI requires a direct physical connection from your PC to the COM port of the network extender you are configuring. (However, the web interface is recommended for subsequent configuration.)

➢ Procedure

1. Plug a DB9 to 8-pin modular adapter into the RS232 serial port on your PC. See *DB9 to 8-Pin Modular Adapter* Pin *Assignments* on page 21.
2. Connect one end of a straight-through Ethernet cable into the adapter plugged into your PC, and the other end of the cable into the COM port on the face of the network extender.

Launching the Terminal Emulation Program

Launch the terminal emulation program on your PC and configure the program settings. Actual configurations will depend upon the program being used, though settings should be modeled after the list below; most are standard defaults. Refer to your terminal emulation program's user manual for further information.

Baud:	9600	Port:	Com 1
Data Bits:	8	Stop Bits:	1
Flow Control:	none	Transmit Delay:	n/a
Parity:	none		

Logging Into the CLI

Once your terminal emulation program has been launched, device information is displayed, followed by a request for username and password. You must log in as a superuser in order to make configuration changes.

Username: superuser

Password: Password

Using the CLI to Establish In band Management

Option 1:

After you have logged in, enter a question mark (?) to list the available commands.

CLI Set commands are used to establish inband management. For example:

```
set slot 1 ip_address 137.182.10.251
set slot 1 subnet_mask 255.255.255.0
set slot 1 default_gateway 137.182.10.10
```

The Subscriber unit in this example can now be managed with web management by attaching a PC to one of the network extender's Ethernet ports or through the DS3 ports by opening the address 137.182.10.251 in a web browser.

Option 2:

After you have logged in, enter "H" for Help, to list the available commands.

CLI commands are used to establish inband management. For example:

```
cd syscfg
cd mgtcfg
ipaddress 137.182.10.251
subnetmask 255.255.255.0
defaultgateway 137.182.10.10
submit
```

Note – It is necessary to type "submit" and hit "enter" for the settings to be enabled

Resetting the Network Extender to Factory Defaults

The network extender supports a reset process that may be used to delete the current configuration and return it to the factory defaults, including the default password.

➢ Procedure

To return the network extender to its factory default configuration:

1. The reset button is located behind a small hole on the left side of the faceplate of the network extender. Use a straightened paper clip to gently push the button and let it go.
2. Wait a few seconds until the DS3 Port LEDs flash green starting at Port 1 and ending at Port 2 (on an ETHX-DS3-2-LT unit). Gently push the reset button again within 3 seconds of port 1 or port 2 LED illumination. NVRAM is cleared, and all configurations on the unit are set to the factory defaults.

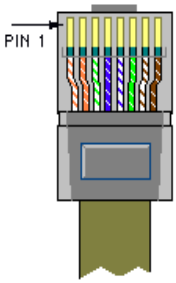
Note – As mentioned previously, the factory default for mode is “provider”. Therefore, if the unit was a “subscriber” unit before the reset, the mode must be changed back to subscriber mode after the reset is complete. The process of changing the mode is described earlier in this manual.

Connector Pin Assignments

Ethernet Pin Assignments

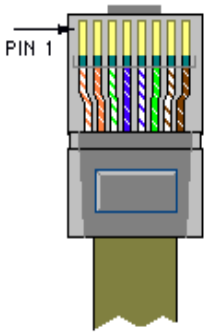
Table 3. Ethernet Pin Assignments

Pin	Function
Pin 1	Rx+
Pin 2	Rx–
Pin 3	Tx+
Pin 4	not used
Pin 5	not used
Pin 6	Tx–
Pin 7	not used
Pin 8	not used



DB9 to 8-Pin Modular Adapter Pin Assignments

To connect the COM port to the DB9 serial port of a PC, use an adapter wired as shown:



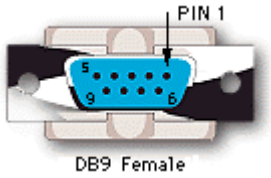


Table 4. DB9 to 8-Pin Modular Adapter Pinouts

Pin	8-Pin Modular Port		Direction	PC RS232 Serial Port		Pin
1	Transmit Data	TxD		RxD	Receive Data	2
2	Data Set Ready	DSR		RTS	Request to Send	7
4	Receive Data	RxD		TxD	Transmit Data	3
5	Ground	GND		GND	Ground	5
6	Data Terminal Ready	DTR		CTS	Clear to Send	8

Pins not shown are unused.

Specifications

Specifications are subject to change without notice.

Table 5. Specifications

Specification	Criteria
Bandwidth/Distance	Up to 44.736 Mbps per DS3 port ETHX-DS3-1-LT: Up to 44.736 Mbps ETHX-DS3-2-LT: Up to 89.4 Mbps using loop bonded DS3 circuits
Dimensions	1.25" (3.2 cm) High x 8.5" (21.6 cm) Wide x 4.75" (12.1 cm) Deep
Interfaces	ETHX-DS3-1-LT: 2 BNC 75 ohm jacks (Tx and Rx) ETHX-DS3-2-LT: 4 BNC 75 ohm jacks (2-Tx and 2-Rx) 4 10/100BaseT 8-position jacks
Operating Environment	Temperature: 32 F to 122 F (0 C to 50 C) Non-operating temperature: –40 F to 158 F (–40 C to 70 C) Humidity: 5% to 95%, non-condensing Altitude: –200 ft to 16,500 ft (–60 m to 5,000 m)
Power	ETHX-DS3-1-LT: –48 VDC, 0.2 A, 11 W ETHX-DS3-2-LT: –48 VDC, 0.3 A, 15 W
Protocols Supported	Transparent 802.1D Bridging DS3 Line Code: C-bit parity (unchannelized DS3)
Regulatory Compliance	EMC: FCC Part 15; ICES-003; EN 300 386-2; CE Marking Safety: UL1950, CSA C22.2 No. 950; EN60950; IEC950; CE Marking Telecom: FCC Part 68; Industry Canada CS-03
Standards Supported	IEEE 802.3 Ethernet IEEE 802.1p Priorities IEEE 802.1Q VLAN
Weight	1.0 lbs (0.45 kg)

EMI Notices

United States – EMI Notice:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The authority to operate this equipment is conditioned by the requirements that no modifications will be made to the equipment unless the changes or modifications are expressly approved by Zhone Technologies, Inc.

If the equipment includes a ferrite choke or chokes, they must be installed per the installation instructions.

Canada – EMI Notice:

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil num rique de la classe A est conforme la norme NMB-003 du Canada.

NEBS Compliance

The equipment has been tested and found to comply with NEBS requirements as defined in Telcordia document SR-3580 Issue 2, January 2005 for NEBS Level 1, plus the amendments to this requirement made by Verizon, AT&T and the Telecommunications Carrier Group in the following documents:

* Telecommunications Carrier Group NEBS Checklist SIT.NEBS.TE.NPI.2004.015, Issued April 4, 2006 (non-Carrier requirements only)
* Verizon NEBS Clarification Document SIT.NEBS.RQS.NPI.2004.019, Issued Feb 27 2006 (non-Carrier requirements only)
* Verizon NEBS Requirements by Location SIT.NEBS.RQS.NPI.2005.031, Issued Nov 14 2005 (non-Carrier requirements only)
* AT&T TP76200, Issue 10, August 11, 2006 (non-Carrier requirements only)

This testing verifies that the equipment meets the requirements for deployment in a telecommunications carrier's central office of equipment owned by another carrier. It does not imply compliance to NEBS for deployment in any other manner.

Service and Repair

If trouble is experienced with this equipment, please contact your local sales representative, service representative, or distributor directly for any help needed. For additional information concerning warranty, sales, service, repair, installation, documentation, training, distributor locations, or Zhone worldwide office locations, use one of the following methods:

- Internet: Visit the Zhone World Wide Web site at www.Zhone.com. (Be sure to register your warranty at www.Zhone.com/warranty.)
- Telephone: Call our automated system to receive current information by fax or to speak with a company representative.
  - Within the U.S.A. and Canada, call (877) Zhone-20 (946-6320)
  - Outside the U.S.A., call +1 (510) 777-7000

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

The customer may make no repairs to the equipment.

Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.
3. Do not attempt to service this product yourself, as opening or removing covers may expose you to hazardous voltage or to other risks. Refer all servicing to qualified service personnel.
4. General purpose cables are used with this product for connection to the network. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer.
5. When installed, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.
6. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are interconnected, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.
7. Input power to this product must be provided by one of the following: (1) a UL Listed/CSA certified power source with a Class 2 or Limited Power Source (LPS) output for use in North America, or (2) a certified Class II power source, with a Safety Extra Low Voltage (SELV) output having a maximum of 240 VA available, for use in the country of installation.
8. In addition, since the equipment is to be used with telecommunications circuits, take the following precautions:
   - — Never install telephone wiring during a lightning storm.
   - — Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
   - — Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
   - — Use caution when installing or modifying telephone lines.
   - — Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
   - — Do not use the telephone to report a gas leak in the vicinity of the leak.

Product Documentation Online

Complete documentation for Zhone products is available at **www.Zhone.com**. Select Service & *Support then* select *Documentation*.

To order a paper copy of a Zhone document, or to speak with a sales representative, please call (877) Zhone-20 (946-6320).

Copyright 2007 Zhone Technologies, Inc.. Printed in U.S.A.